

ANNUAL REPORT FOR 2000



Spring Branch Mitigation Site

New Hanover County

Project No. 8.2250109

TIP No. U-92 WM



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SUMMARY

The following report summarizes the monitoring activities that have occurred in 2000 at the Spring Branch Mitigation Site, representing the third and final year of monitoring.

The site is equipped with 3 groundwater monitoring wells, 2 surface gauges, and 1 rain gauge. The rain gauge, an automatic recording tipping bucket type, was installed on May 18, 2000, and therefore did not record rain data for the entire growing season. Because of this, local weather station data was substituted for the on-site rainfall data.

Hydrologic monitoring results were similar to the previous years. The site was saturated to the soil surface or inundated for the entire growing season.

Four vegetation monitoring plots are located on the site. The site met the vegetation success criteria with an average of 515 trees per acre.

Based on monitoring results of 2000, NCDOT recommends that the site be deemed successful, and monitoring be discontinued.

1.0 Introduction

1.1 Project Description

The Spring Branch Mitigation Site is located in New Hanover County, adjacent to the U-92C alignment project in Wilmington (Figure 1). Approximately 11 acres in size, the site provides compensatory mitigation for a portion of the U-92C wetland impacts. The site consists of swamp and bottomland forest and an open water habitat. This establishes a wetland system including a creek, open water, and an associated floodway.

1.2 Purpose

In order to demonstrate successful mitigation, the Spring Branch site is monitored for both hydrology and vegetation. 2000 marks the third and final year of monitoring for the site. The following report describes the results of both hydrologic and vegetation monitoring for 2000.

1.3 Project History

December 1997	Site Constructed
March 1998	Site Planted
March 1998	Monitoring Wells Installed
March- November 1998	Hydrologic Monitoring
August 1998	Vegetation Monitoring (1 yr.)
March- November 1999	Hydrologic Monitoring
October 1999	Vegetation Monitoring (2 yr.)
March- November 2000	Hydrologic Monitoring
September 2000	Vegetation Monitoring (3 yr.)



FIGURE 1 - Site Location Map

2.0 Hydrology

2.1 Success Criteria

In accordance with federal guidelines for wetland mitigation, the success criteria for hydrology states that the area must be inundated or saturated (within 12" of the surface) by surface or ground water for a consecutive 12.5% of the growing season. Areas inundated less than 5% of the growing season are always classified as non-wetlands. Areas inundated between 5% - 12.5% of the growing season can be classified as wetlands depending upon factors such as the presence of hydrophytic vegetation and hydric soils.

The growing season in New Hanover County begins February 27 and lasts until November 26. These dates correspond to a 50% probability that air temperature will drop to 28° F lower after February 27 and before November 26.¹ Thus the growing season is 271 days; optimum hydrology requires 12.5% of this season, or 34 days. Local climate must represent average conditions for the area.

2.2 Hydrologic Description

Three monitoring wells, two surface gauges, and one rain gauge were installed in March of 1998 (Figure 2). Because of the amount of surface water on the site, each groundwater well was installed to record water levels both above and below ground level. Daily readings are taken throughout the growing season.

Appendix A contains a plot of the water depth for each monitoring well and surface gauge. Monitoring results are shown from February 27 to November 26. Daily precipitation data is provided on each graph.

2.3 Results of Hydrologic Monitoring

2.3.1 Site Data

The maximum number of consecutive days that the groundwater was within twelve inches of the surface was determined for each well. This number was converted into a percentage of the 271-day growing season. Because it is uncertain if all wetlands impacted by NCDOT highway projects meet the 12.5% criteria, the monitoring well results are segmented into percentage ranges. Table 1 presents the monitoring results for the 2000 growing season as a range of percentages, actual percentage, and success dates of the longest hydroperiod on the site.

¹ Soil Conservation Service, Soil Survey of New Hanover County, North Carolina, 1977.

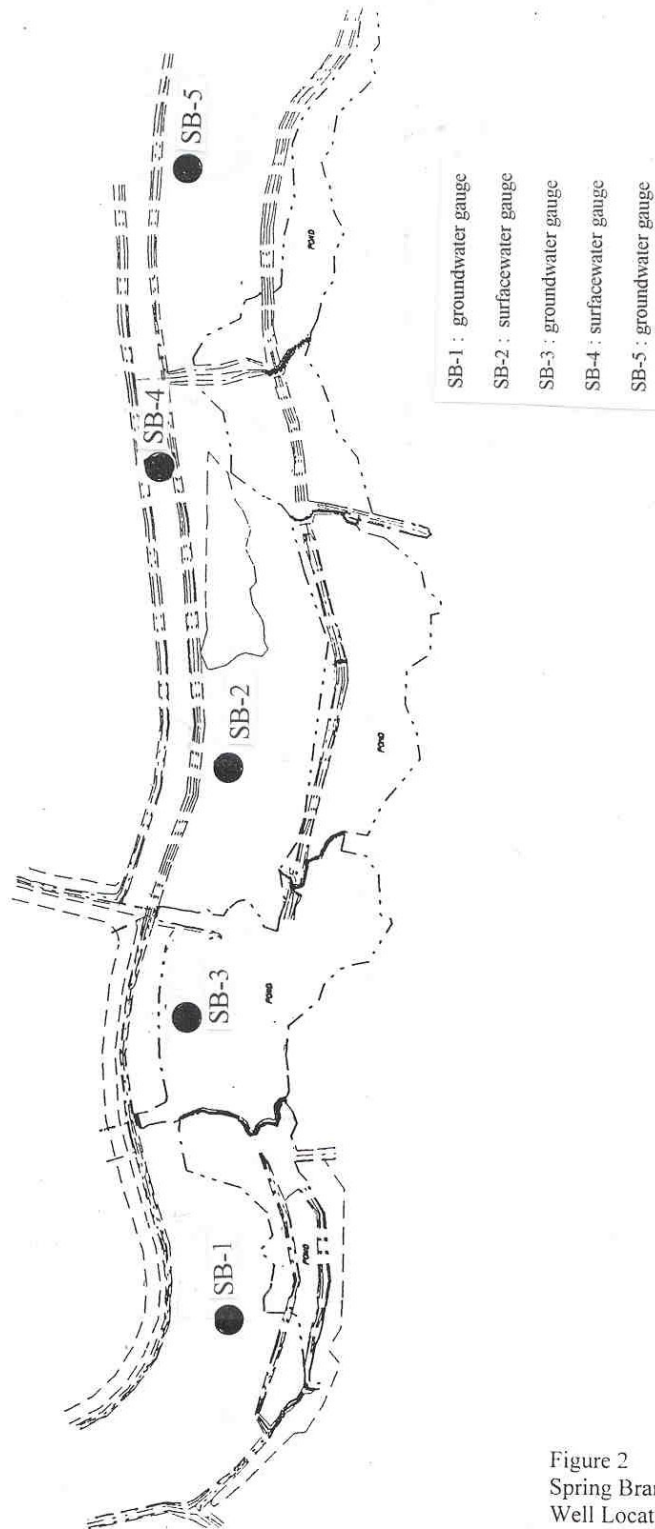


Figure 2
Spring Branch Mitigation Site
Well Location Map

Table 1. HYDROLOGIC MONITORING RESULTS

Monitoring Well	< 5%	5% - 8%	8% - 12.5%	> 12.5%	Actual %	
SB-1				✓	100	Feb 27-Nov. 26
SB-3				✓	100	Feb 27-Nov. 26
SB-5				✓	100	Feb 27-Nov. 26

The three wells on the site recorded the water table within 12 inches of the surface for more than 12.5% of the growing season. The surface water gauges indicated a consistent presence of surface water throughout the growing season. Figure 3 is a graphic representation of the 2000 monitoring results.

2.3.2 Climatic Data

Figure 4 represents an examination of the local climate in comparison with historical data to determine if 2000 rainfall falls within the average rainfall range of the area. The historical data was provided by the National Climatic Data Center; the recent rainfall data was provided by the State Climate Office at NC State University.

February, March and October were the only months with below average rainfall for the Wilmington area. Monthly rainfall totals for the majority of the growing season were within or above the average monthly range.

2.4 Conclusions

The Spring Branch Mitigation site met the hydrologic success criteria during 2000. The hydrologic monitoring results were consistent with results from 1998 and 1999, with the soil saturation at the surface or inundation of the site throughout the majority of the growing season.

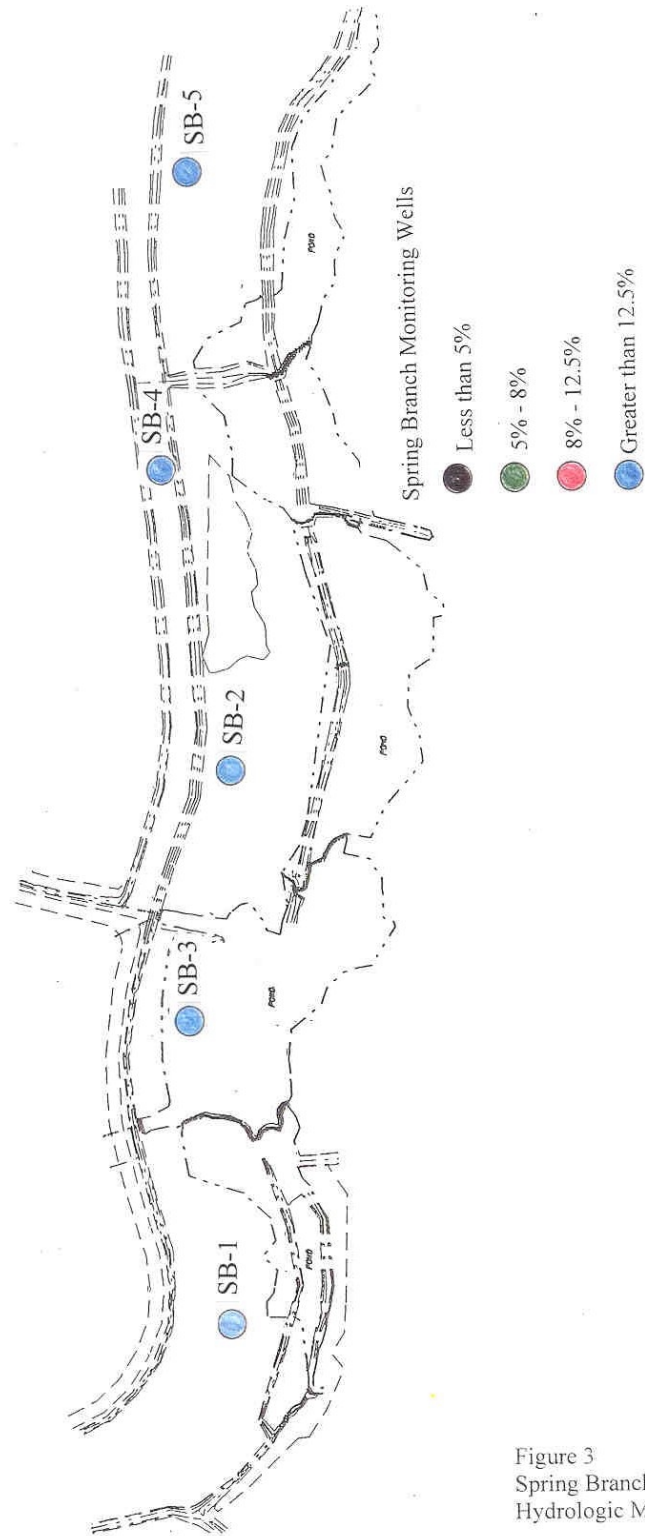
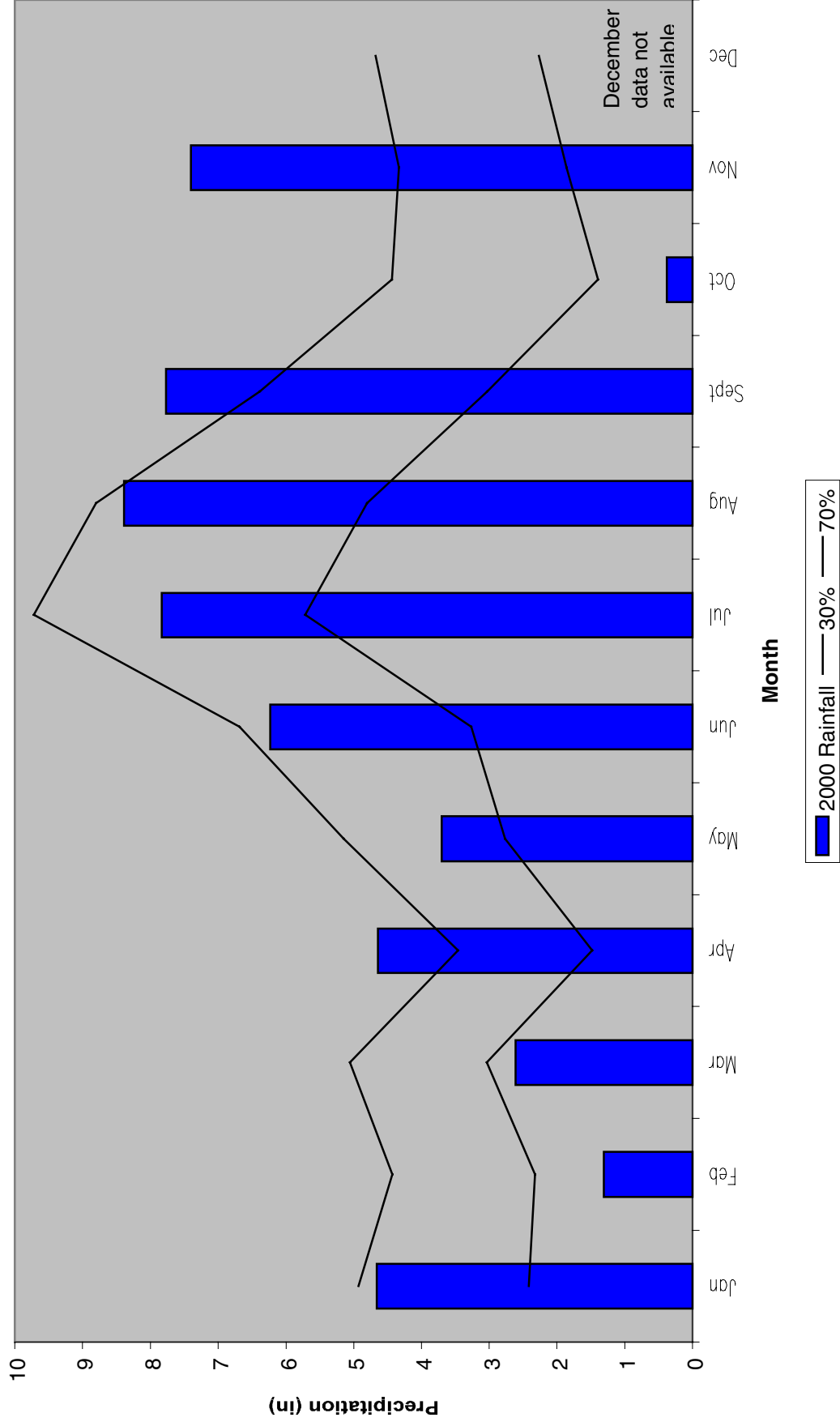


Figure 3
Spring Branch Mitigation Site
Hydrologic Monitoring Map

**Figure 4. Spring Branch 30 - 70 Percentile Graph
Wilmington, NC**



3.0 Vegetation: Spring Branch Mitigation Site (Year 3 Of 3)

3.1 Success Criteria

Success Criteria states that there must be a minimum of 320 trees per acre surviving for three consecutive years.

3.2 Description of Species

The following tree species were planted in the Wetland Restoration Area:

Nyssa aquatica, Tupelo Gum

Quercus lyrata, Overcup Oak

Taxodium distichum, Bald Cypress

Quercus pagoda, Cherrybark Oak

Cephalanthus occidentalis, Buttonbush

3.3 Results of Vegetation Monitoring (3 year)

Table 2. Vegetation Monitoring Results

Plot # (Type)	Bald Cypress	Tupelo Gum	Buttonbush	Overcup Oak	Total (3 year)	Total (at planting)	Density (Tree/Acre)
1(BLH)	2	22	0	1	25	29	586
2(BLH)	8	21	0	3	32	44	495
3(BLH)	11	6	0	7	24	40	408
4(BLH)	9	18	2	2	31	37	570
AVERAGE DENSITY							515

To determine tree density, 50' x 50' plots are installed immediately following Planting (Figure 5). The actual number of planted trees which occur within the plot are counted. This number is equated to the number within each plot, which represents 680 trees per acre (average). The survival monitoring number is compared to the planted number to obtain survival percentage. This percentage is applied to the 680 trees per acre to obtain an estimated tree per acre for the site. (Density = monitoring count / planted trees x 680)

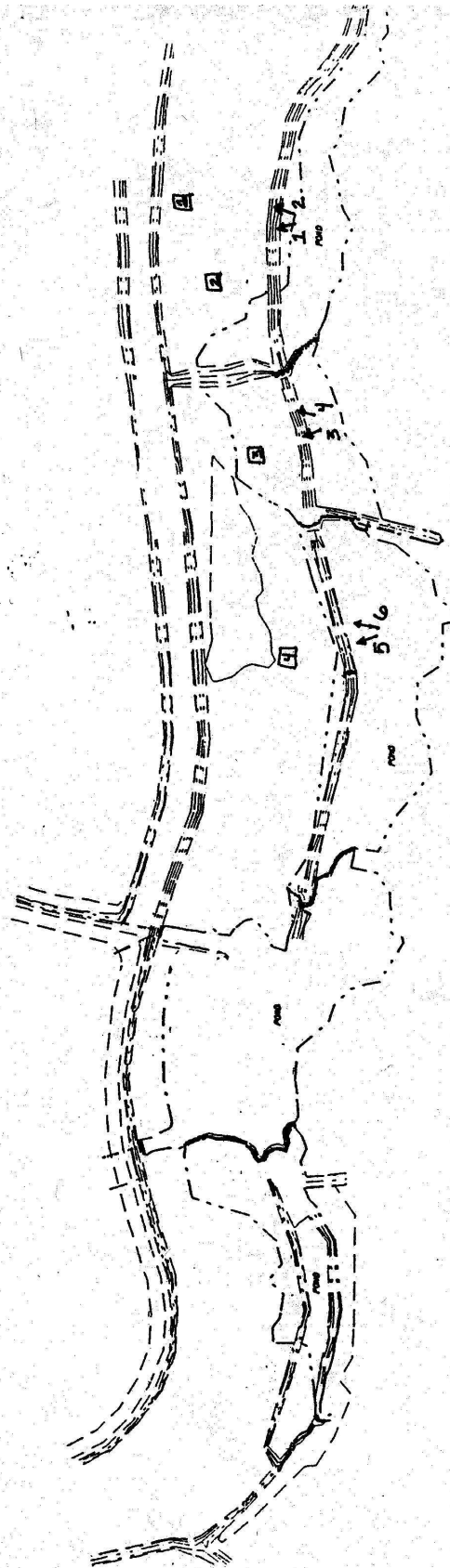


Figure 5.
Spring Branch Mitigation Site
Approximate Plot and Photo Locations

Site Notes: Other species noted: *Juncus* (heavy), black willow, cattails, woolgrass, sesbane, ragweed, cardinal flower, *Cyperus*, grasses, sedges, volunteer cypress and lespedeza in some areas. There was 6 inches standing water in plot 4.

3.4 Conclusions

Approximately 9.5 acres was graded on this site. The entire site was then planted with the specified species. There were four vegetation monitoring plots established in the planting area. The vegetation monitoring of these plots revealed an average density of 515 trees per acre, which is well above the success criteria requirement of 320 trees per acre.

4.0 OVERALL CONCLUSIONS/ RECOMMENDATIONS

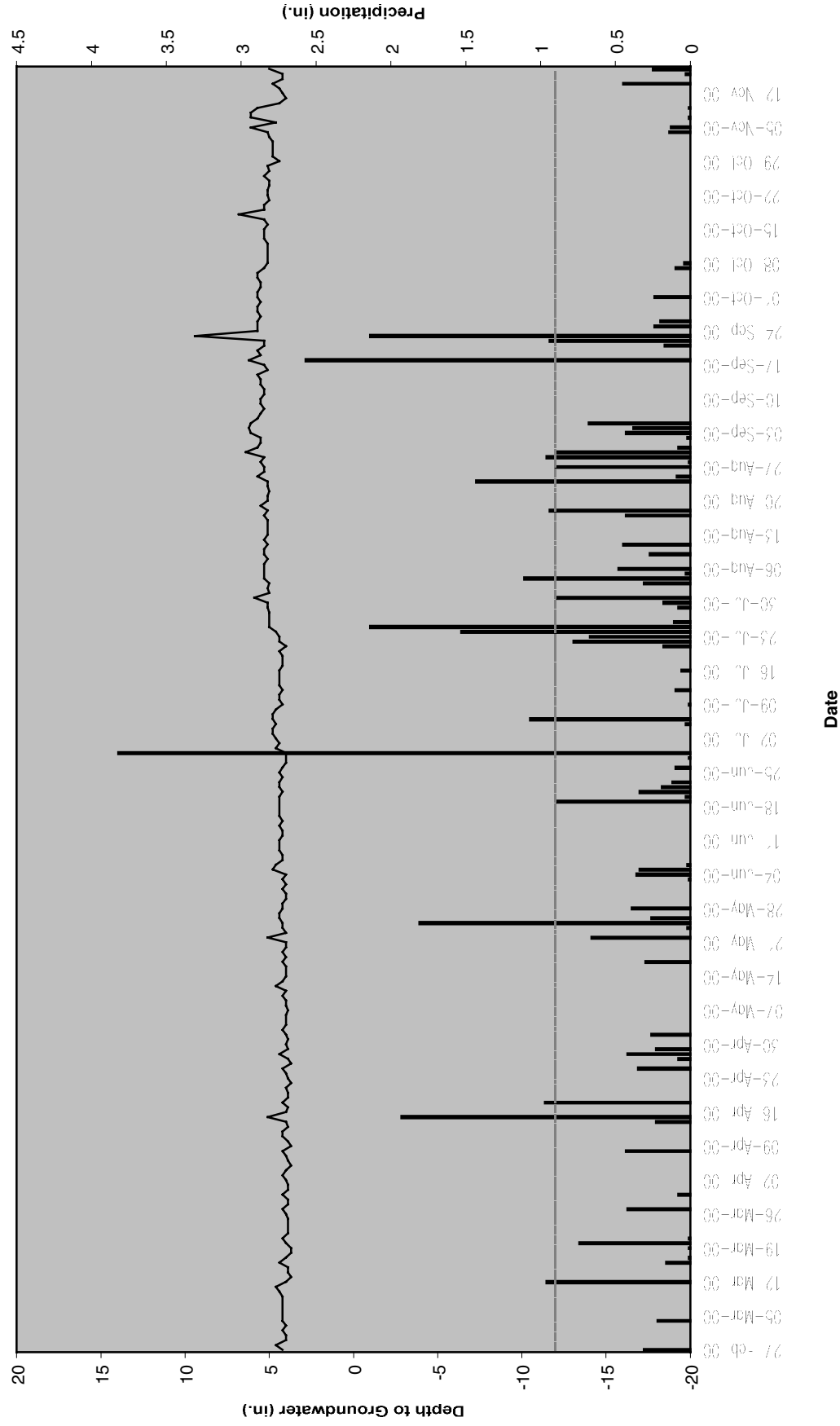
During the third year of monitoring, the Spring Branch Site showed saturation or inundation for the entire season. Vegetation monitoring yielded an average density of 515 trees per acre.

Based on these results, NCDOT recommends that monitoring be discontinued. The site has met the hydrological and vegetative success criteria for three consecutive years, and has therefore fulfilled the requirements stated in the monitoring plan and the permit.

APPENDIX A

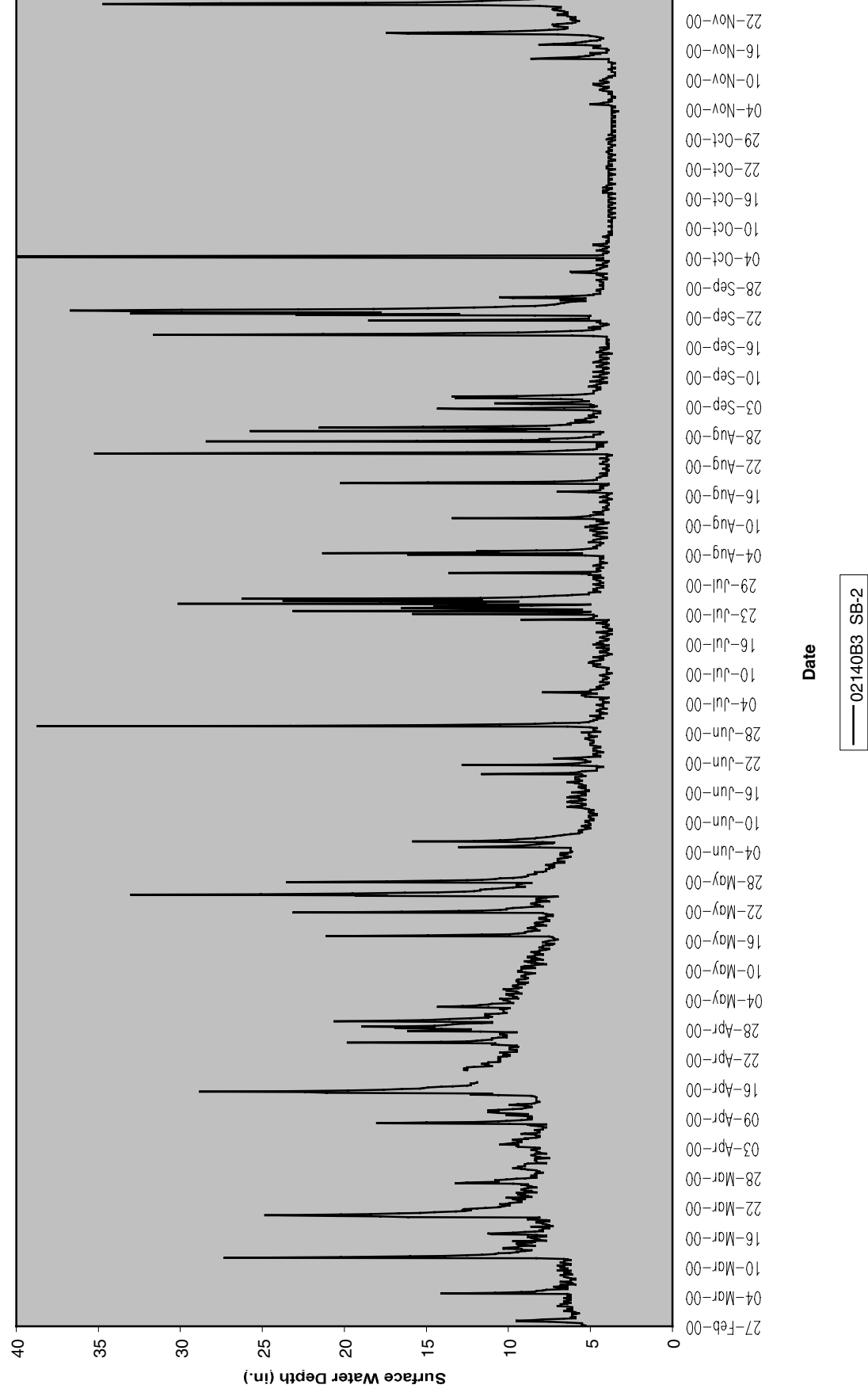
Depth to Groundwater/ Surfacewater Plots

Spring Branch SB-1

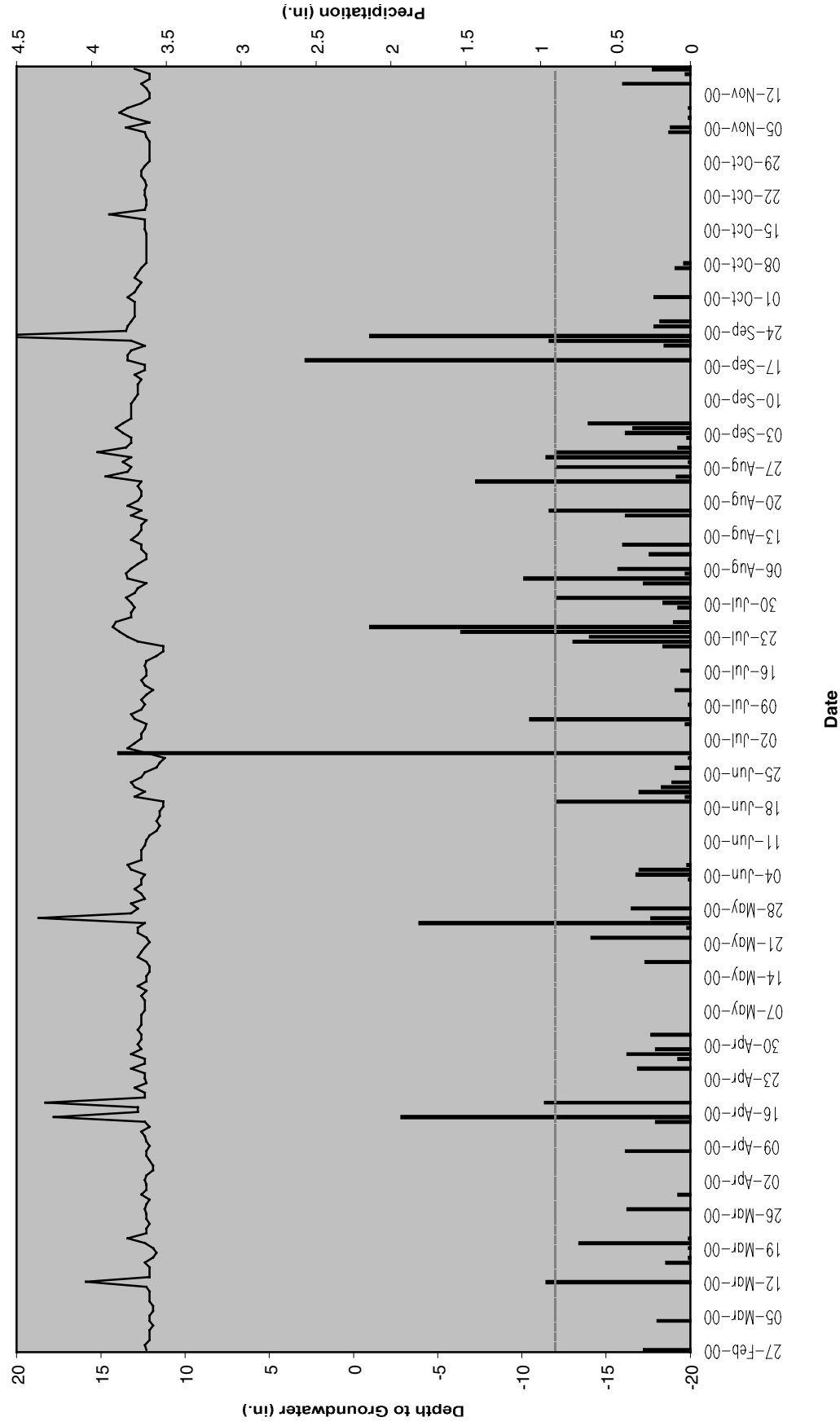


■ Rainfall- NC Climatic Data — 02140F5 SB-1 - - - - - Required Depth

Spring Branch SB-2

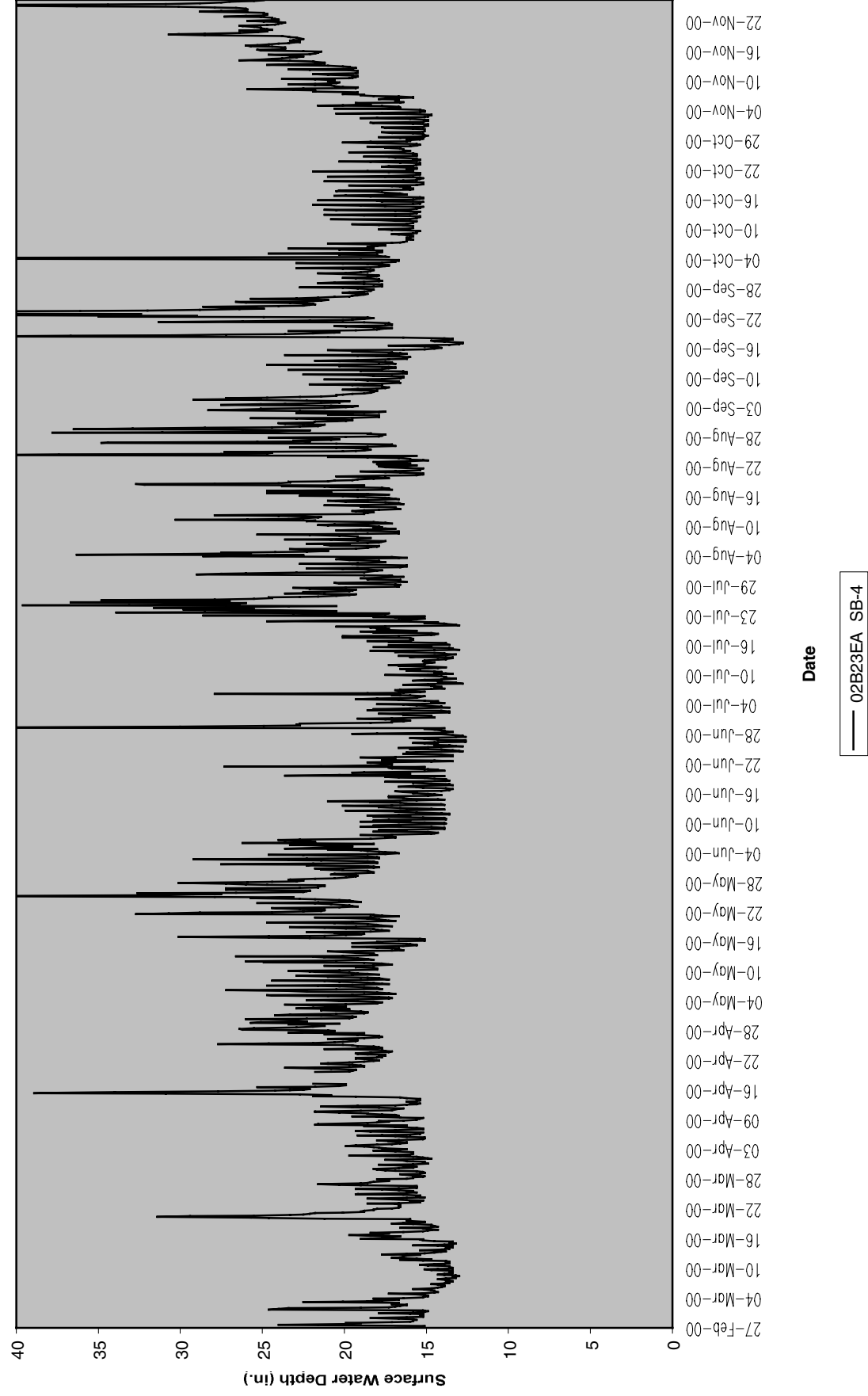


Spring Branch SB-3

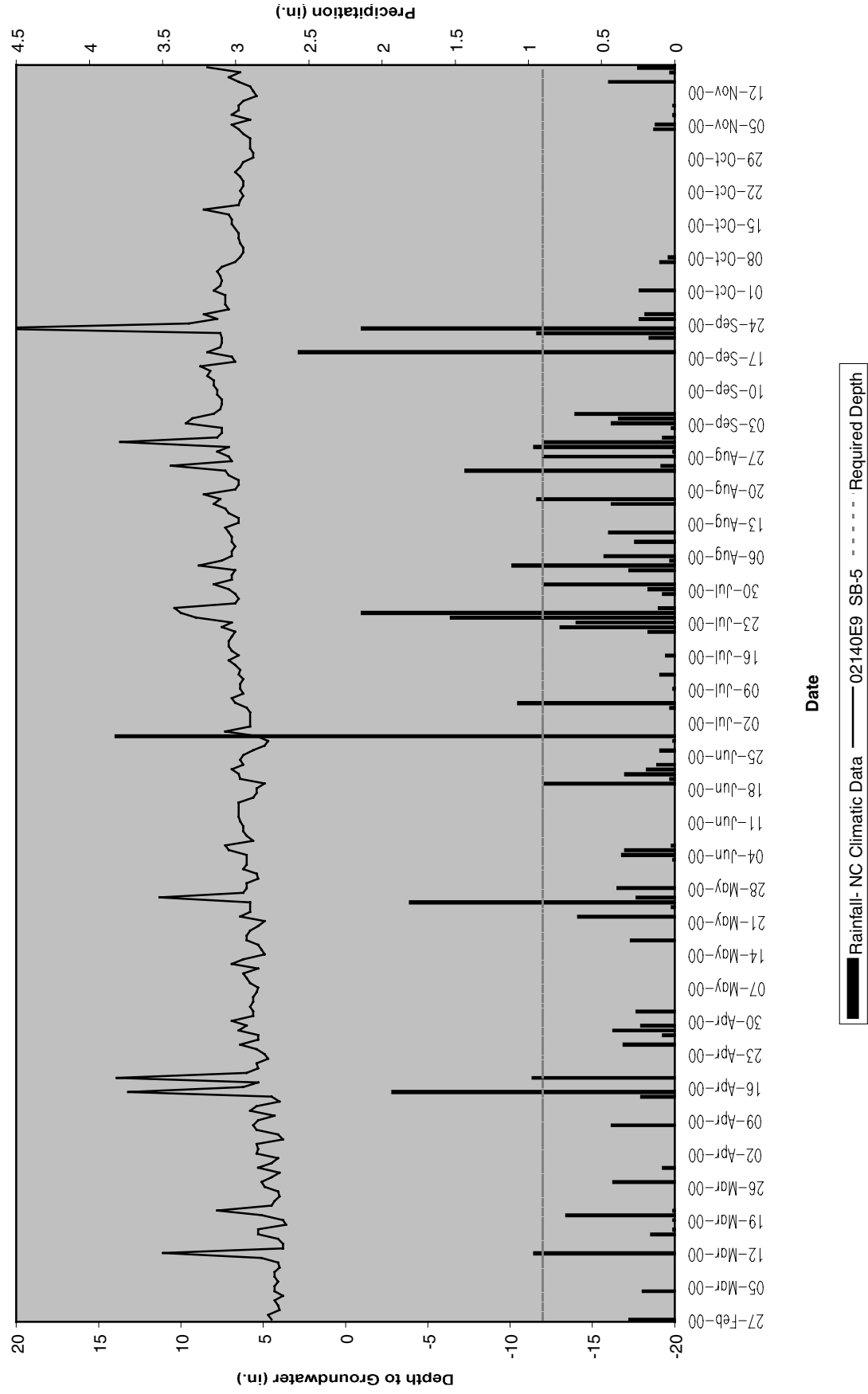


■ Rainfall- NC Climatic Data — 0213D90 SB-3 - - - - Required Depth

Spring Branch SB-4



Spring Branch SB-5



APPENDIX B

Site Photos

Spring Branch



Photo 1



Photo 2



Photo 3



Photo 4



Photo 5



Photo 6

(Photograph locations are shown on Figure 5)